Claims

[c1]

1. A method for making a semiconductor light source intended to be used for emitting light to illuminate a space used by humans, the method comprising:

fabricating an enclosure, said enclosure being fabricated from a material substantially transparent to white light, and said enclosure having an interior volume,

fabricating a heat sink to be located within said enclosure, said heat sink having a plurality of panels on it which facilitate mounting of semiconductor devices thereon, said heat sink being adapted to draw heat away from semiconductor devices mounted on it,

selecting a plurality of semiconductor devices capable of emitting light, said semiconductor devices being selected from the group consisting of light emitting diodes, light emitting diode arrays, laser chips, LED modules, laser modules, and VCSEL chips,

mounting said semiconductor devices on said heat sink,

applying a conversion coating for converting monochromatic light emitted by said chips to white light.

[c2]

2. A method as recited in claim 1 wherein said coating is applied to the interior of said enclosure.

[c3]

3. A method as recited in claim 1 wherein said coating is applied to at least one of said semiconductor devices.

[c4]

4. A method as recited in claim 1 further comprising the step of installing a power module for powering the light source, said power module including a fitting for installation in a traditional light bulb socket and an AC/DC converter for converting AC power from traditional building wiring to DC power usable by a semiconductor devices.

[c5]

5. A method as recited in claim 1 wherein said semiconductor devices are mounted to said heat sink by use of heat conductive adhesive located between said chip and said heat sink and serving to conduct heat from said chip to said heat sink.

[c6]

6. A method as recited in claim 1 further comprising the step of placing a quantity of light reflective adhesive located between said semiconductor devices and said heat sink.

[c7]

7. A method as recited in claim 1 wherein at least one of said semiconductor devices chip includes

a substrate on which epitaxial layers are grown,

a buffer layer located on said substrate, said buffer layer serving to mitigate differences in material properties between said substrate and other epitaxial layers,

a first cladding layer serving to confine electron movement within the chip, said first cladding layer being adjacent said buffer layer,

an active layer, said active layer emitting light when electrons jump to a valance state,

a second cladding layer, said second cladding layer positioned so that said active layer lies between cladding layers, and

a contact layer on which an electron may be mounted for powering said chip.

[c8]

8. A method as recited in claim 1 further comprising installing a fan in said light source to facilitate air circulation and cooling.

[c9]

9. A method as recited in claim 1 further comprising forming an air chamber in said heat sink.

[c10]

10. A method as recited in claim 9 further comprising placing a quantity of TE cooler material on the interior of said air chamber.

[c11]

11. Method for making a semiconductor light source comprising the steps of:

obtaining an enclosure, said enclosure being fabricated from a material substantially transparent to white light,

obtaining a base to which said enclosure may be mounted,

obtaining a secondary heat sink suitable for being located within said enclosure, said secondary heat sink being capable of drawing heat from one or more semiconductors devices, said secondary heat sink having a plurality of panels on it suitable for mounting primary heat sinks thereon, said panels on said secondary heat sink being oriented to facilitate emission of light from the semiconductor light source in desired directions around the semiconductor light source,

obtaining a plurality of primary heat sinks,

obtaining a plurality of semiconductor devices,

mounting at least one semiconductor device on each of said primary heat sinks, and

mounting said primary heat sinks on said secondary heat sink panels.

[c12]

12. A method as recited in claim 11 wherein at least one of said semiconductor chips capable of emitting light.

[c13]

13. A method as recited in claim 12 wherein said chip is capable of emitting monochromatic light.

[c14]

14. A method as recited in claim 13 further comprising the step of applying a light conversion coating to said enclosure, said coating being capable of converting monochromatic light to white light.

[c15]

15. A method as recited in claim 13 further comprising the step of applying a light conversion coating to said enclosure, said coating being capable of converting monochromatic light to white light.

[c16]

16. A method as recited in claim 11 wherein said mounting step is performed using heat conductive adhesive.

[c17]

17. A method as recited in claim 11 wherein at least one of said semiconductor devices is selected from the group consisting of light emitting diodes, light emitting diode arrays, laser chips, and VCSEL chips.

[c18]

18. A method as recited in claim 11 wherein at least one of said heat sinks includes a material selected from the group consisting of include copper, aluminum, silicon carbide, boron nitride natural diamond, monocrystalline diamond, polycrystalline diamond, polycrystalline diamond compacts, diamond deposited through chemical vapor deposition and diamond deposited through physical vapor deposition.

[c19]

19. A method as recited in claim 11 further comprising the step of applying a quantity of light reflective adhesive located between at least one of said semiconductor devices and said primary heat sink.

[c20]

20. A method as recited in claim 11 wherein at least one of said semiconductor devices includes

a substrate on which epitaxial layers are grown,

a buffer layer located on said substrate, said buffer layer serving to mitigate differences in material properties between said substrate and other epitaxial layers,

a first cladding layer serving to confine electron movement within the chip, said first cladding layer being adjacent said buffer layer,

an active layer, said active layer emitting light when electrons jump to a valance state, and

a second cladding layer, said second cladding layer positioned so that said active layer lies between cladding layers.

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